

REMARKS

The foregoing amendment amends independent claims 1, 15, 48 and 49. Pending in the application are claims 1-22, 24-41, 48 and 49, of which claims 1, 15, 48 and 49 are independent. The following comments address all stated grounds for rejection and place the presently pending claims, as identified above, in condition for allowance.

Independent claims 1, 15, 48 and 49 are amended for purposes of clarity to specify that the fluid interface port is separate from the first and second terminal ends of the microchannel. The amendment clarifies that the fluid interface port is not part of either the first or second terminal end of the microchannel and instead provides at least a third opening into the microchannel, as illustrated in at least Figures 2-8 of the application as originally filed.

Amendment and/or cancellation of the claims is not to be construed as an acquiescence to any of the objections/rejections set forth in the instant Office Action, and was done solely to expedite prosecution of the application. Applicant reserves the right to pursue the claims as originally filed, or similar claims, in this or one or more subsequent patent applications.

Finality Premature

Applicants respectfully submit that this final rejection is premature. The Examiner states that the action is made final because all claims “could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application” (Office Action, page 7). Applicants respectfully disagree.

In Applicants’ last response, Applicants amended independent claims 1, 15, 48 and 49 to recite that “such that none of the liquid in the microchannel enters the fluid interface port when the virtual wall is formed.” As a result of Applicants’ amendments and arguments, the Examiner reconsidered and vacated rejections based upon two references.

In addition, the Examiner maintained that the claims were anticipated by the Fuchs reference. The Examiner alleges that the action may be made final because the claims are being rejected based on the same ground and art that was cited in the last action. The Examiner, however, improperly rejected the claims on the same ground and art because the Examiner did

not consider the amendments made to the claims. Instead, the Examiner merely referred to the Examiner's prior rejection of the claims, which did not recite that "none of the liquid in the microchannel enters the fluid interface port when the virtual wall is formed." These additional amendments must be considered and found by the Examiner in the references. Thus, they would create new grounds for rejection.

Accordingly, Applicants respectfully request the Examiner to reconsider and to withdraw the finality of the rejection and to approve a refund of Applicants' Request for Continued Examination fee because the finality of the rejection was premature since the amendments necessitated new grounds of rejection. Alternatively, Applicants respectfully request the Examiner to reconsider and to withdraw the finality of the rejection and to approve a refund of Applicants' Request for Continued Examination fee because the Examiner did not provide a *prima facie* case of anticipation because the Examiner did not specify how "each and every element as set forth in the claim is found" in the Fuchs reference (MPEP 2131.01).

Double Patenting Rejection

Claims 1-22 and 24-41 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-28 and 58-150 of copending Application No. 10/028,852 as characterized by US 2003/0007898 and claims 1-45 of copending Application No. 10/057,354. Applicants submit that the claims are patentably distinct from the claims of co-pending U.S. Patent Application Nos. 10/028,852 and 10/057,354. If necessary, Applicants will file a Terminal Disclaimer upon resolution of all other outstanding issues.

In addition, the Examiner rejects claims 1-22 and 24-41 on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent Number 6,877,528. The claims in the present application are entirely different from the claims in U.S. Patent Number 6,877,528, as previously set forth. However, to expedite prosecution, Applicants will file a Terminal Disclaimer upon resolution of all other outstanding issues.

35 U.S.C. §112 Rejection

In the Office Action, the Examiner rejects claims 1-22, 24-41 and 48-49 under 35 USC §112, first paragraph, as failing to comply with the written description requirement. Applicants submit that the subject matter of the claims is sufficiently described in the specification as originally filed, and request that the rejection under 35 USC §112, first paragraph be reconsidered and withdrawn.

Regarding the assertion that the specification does not teach the claimed diameter of the port being less than the diameter of the microchannel, Applicants submit that Figure 2A clearly shows the diameter of the port as less than the diameter of the microchannel. In addition, page 21, lines 4-5 specifically describe the “lateral dimensions of the fluid interface port” as “less than the diameter of the microchannel 3.” Therefore, the recitation is sufficiently supported.

The Examiner argues that “it is not clear if the claimed ‘depth’ is analogous to the specifications teaching of diameter” and that the recitation that “the depth of the fluid interface port is significantly smaller than the diameter of the fluid interface port” is not taught or supported (Office Action, page 5). However, the Examiner has not rejected the element “the depth of the fluid interface port is significantly smaller than the diameter of the fluid interface port” under 35 USC §112, first paragraph (Office Action, page 2). Thus, the Examiner seems to be confusing this element with the rejected element, “the diameter of the microchannel is larger than the diameter of the fluid interface port,” which is supported in the specification, as explained in the prior paragraph.

With respect to the Examiner’s comment, depth is not analogous to diameter since then the element “the depth of the fluid interface port is significantly smaller than the diameter of the fluid interface port” would not make any sense. Instead, the depth of the fluid interface port is measured in the direction perpendicular to the diameter of the fluid interface port and is generally equivalent to the thickness of the sidewall in which the fluid interface port is formed. As illustrated in at least Figures 2-8 of the specification, the depth of the fluid interface port is significantly smaller than the diameter of the fluid interface port. Therefore, the recitation is sufficiently supported.

Regarding the assertion that the specification does not teach “none of the liquid in the microchannel enters the fluid interface port when the virtual wall is formed,” Applicants submit that adequate support is found in the specification. A fluid interface port in which none of the liquid from the microchannel enters the fluid interface port when the virtual wall is formed is shown in Figure 9A and described on page 21, lines 4-28. A “virtual wall” is described in the Specification on page 17, lines 10-30. Applying the definition of virtual wall to Figure 9A, one sees that Figure 9A clearly illustrates that once the fluid is in the microchannel and the virtual wall is formed, the liquid in the microchannel does not enter the fluid interface port when there is zero dead volume, as illustrated in Figure 9A. “Dead volume refers to the volume of liquid retained in the fluid interface port 17,” so *zero dead volume* means that no liquid is retained in the fluid interface port 17 (Specification, page 21, lines 9-10). The Examiner comments that adding fluid through the port appears to contradict this element. However, the element recites that “none of the liquid in the microchannel enters the fluid interface port when the virtual wall is formed.” Adding fluid through the port occurs before or after the virtual wall is formed, but not when it is formed. In addition, fluid that is added through the port is external to the microchannel, not “in the microchannel.” Therefore, the recitation that none of the liquid in the microchannel enters the fluid interface port when the virtual wall is formed is sufficiently supported in the original specification.

For at least these reasons, Applicants request reconsideration and withdrawal of the 35 U.S.C. §112 Rejection.

Claim Rejections Under 35 USC §102

In the Office Action, the Examiner maintains and finalizes the rejection of claims 1-22, 24-41 and 48-49 under 35 U.S.C. 102(b) as being anticipated by the Fuchs reference (U.S. Patent Number 5,757,482). Applicants submit that the pending claims distinguish patentably over the cited references, and request reconsideration and allowance of the pending claims.

Independent claims 1, 15, 48 and 49 specify that none of the liquid in a microchannel enters into the fluid interface port when the virtual wall is formed upon filling of the microchannel. The filling of the microchannel creates the virtual wall meniscus at the fluid interface port, which replaces a removed portion of a side wall of the microchannel, a feature not

disclosed in the cited references. The virtual wall essentially seals the fluid interface port, preventing liquid that fills the microchannel from entering the fluid interface port and resulting in a direct fluid interface with zero dead volume. The Fuchs reference is silent with respect to this feature.

In addition, Applicants maintain that the Fuchs reference does not disclose a device having a fluid interface port with a constant depth that is substantially smaller than the diameter of the fluid interface port, as recited in independent claims 1 and 15. The Fuchs reference states that the cover “will be at least about 10 microns thick and can be several thousand microns thick (about 5000 microns)” (Fuchs, col. 5, lines 9-12). The Fuchs reference is silent, however, as to the diameter of the fluid interface port. In Figure 4 of Fuchs, the port 24 is illustrated as being the width of the channel. Fuchs cautions, however, that the relative scale of items in the Figures cannot be relied on because “the length and depth of each channel and linear passage, and the size of each port or opening is shown using an expanded scale in the figures in order to distinctly depict the features of the apparatus” (Fuchs, col. 6, lines 22-25). The Fuchs reference also states that the channel widths are “more preferably between about 10 microns and about 1000 microns.” Assuming that the port diameter is equivalent to the channel width, the depth of the Fuchs’ port is likely to be equal to the diameter of the fluid interface port at the lower end of the ranges (both 10 microns) or much bigger than the diameter of the fluid interface port at the upper end of the ranges (5000 microns compared to 1000 microns). As explained previously, the recited fluid interface ports have a disk shape, as shown in Figures 2A and 2B, and described on page 17, lines 19-20, to facilitate *direct* access to the channel interior and provide significant advantages, such as direct access to the microchannel interior, low dead volume and greater injection efficiency, none of which are taught or suggested in the Fuchs reference. Thus, the Fuchs references does not disclose a device having a fluid interface port with a constant depth that is substantially smaller than the diameter of the fluid interface port.

The Fuchs reference also fails to disclose that the port 24 is separate from the terminal ends of the microchannel. Instead, the port 24 is used to provide access to the enclosed channel (Fuchs, col. 2, lines 57-58). Therefore, the port 24 is provided at the terminal ends of the microchannel, as illustrated in Fuchs’ Figures 1-4. Thus, the Fuchs reference does not disclose a

fluid interface port, which is an opening in addition to openings that may exist at the first and second terminal ends of a microchannel.

For at least these reasons, and for the reasons submitted in previous responses, Applicants respectfully submit that all pending examined claims are patentable, and request that the objections and rejections be reconsidered and withdrawn.

CONCLUSION

In view of the above amendment, Applicants believe the pending application is in condition for allowance.

If any fee is due, please charge our Deposit Account No. 12-0080, under Order No. TGZ-001CRCE6 from which the undersigned is authorized to draw.

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Respectfully submitted,

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